AD NUMBER

AD833595

NEW LIMITATION CHANGE

TO

Approved for public release, distribution unlimited

FROM

Distribution authorized to U.S. Gov't. agencies and their contractors; Critical Technology; 14 SEP 1966. Other requests shall be referred to Department of the Army, Fort Detrick, MD 21701.

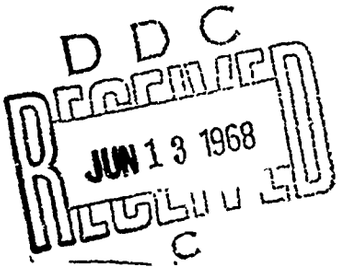
AUTHORITY

SMUFD ltr 15 Feb 1972

TRANSLATION NO. 1798

~~XXXXXXX~~ CA-18-064-D6-00030(A)

DATE: 14 September 1966



1775

CA-18-064-D6-00030(A)

T-446-1

14 September 1966

DEFOLIATION OF WOODY PLANTS

DEFOLIATION OF WOODY PLANTS

Tidsskrift for planteavl, Kobenhavn
Vol. 68, No. 2, pages 365-368, 1964

A. Preliminary Report

When plants are lifted and shipped in the fall it has been general practice in the nurseries to defoliate the plants mechanically, a very time consuming chore.

At Hornum exploratory experiments were started in 1960 with defoliation of plants by chemical means prior to lifting in the fall. Tests were made with various chemicals that were believed to be capable of producing leaf drop without harming the plants. Roses, raspberries and apple grafting stock were used as test plants.

Over a 3 year period it was found that spraying with 20% sulfate of ammonia produced a practically total leaf drop in a short time without any kind of damage to the shoots developing. Spraying with 2% "Endothal forced ripening agent" containing 0.12% Endothal and 0.68% ammonium sulfate was found to be especially effective and did not produce noticeable damage to the shoots.

Not all kinds of roses react equally well to the spraying. Peace for example, which has very thick and shiny leaves, reacted only very weakly to a single spraying, while two successive ammonia sprayings at 8-14 days interval gave good results, table 1-3.

Raspberry plants and apple stock gave better leaf drop by spraying with Endothal than with ammonium sulfate, while all the kinds of roses tested had a tendency to give the best leaf drop for ammonium sulfate, table 1-3.

Furthermore, the tables show that 20% ammonium sulfate is better than 10%, although good results were obtained with that strength also. With Peace, 30% had a good effect in 1962 without producing any harmful effect.

Of Endothal both 2 and 3% worked well, but the danger of spray damage is high for increasing strengths of this agent, hence 2% is to be preferred.

Of other chemicals and agents tested in the experiments it may be mentioned that a 2-6% copper sulfate solution gives a relatively good leaf drop, but produces damage to the shoots in the form of blue-black spots that disfigure the plants considerably. Monochlor acetate and pentachlor phenol also produces some leaf drop, but many dead leaves remain hanging on the plants, and both chemicals cause substantial damage to the shoots. Several other chemical agents were tested, among them DNOC, calcium cyanamide, amino triazol, dinitrobutyl phenol ethylene chlorohydrin and various concentrations of potassium, manganese and zinc sulfate, without any of them being able to stand up against ammonium sulfate and Endothal in effect. They all either produced too little leaf drop or too much harmful effects.

The sprayed plants were observed during the season following treatment, storage and planting for possible after-effects. When the plants were judged there had not been any appreciable damage from either Endothal or ammonium sulfate, which also is shown by the character figures for re-growth.

It is recommended that in practice for the present roses be sprayed ca 2-3 weeks prior to lifting with ca 20% ammonium sulfate. For some thick-leaved roses such as Peace and others the spraying should be repeated 8-14 days later. After defoliation, the plants should be lifted and kept in cold storage, as the buds will otherwise start to open.

Raspberry plants can be sprayed with Endothal or sulfate of ammonia and are rather easily defoliated. Apple trees and stocks are effectively defoliated by spraying with 2% Endothal or 20% ammonium sulfate. Attention is called to the fact that Endothal is very poisonous (hazard class A), while ammonium sulfate is not poisonous.

When spraying nursery plants 12-1500 liters of liquid should be used per hectare, and the plants are to be thoroughly sprayed.

Table 1.

Defoliation of Woody Plants 1961

Defoliation 1-1, 1 = full foliage, 10 = all leaves dropped.

	Judged 8 days after spraying					Judged 14 days after spraying						Remarks re. roses
	R. Multiflora	Orange triumph	New Fensham	Peace *)	Raspberry	R. Multiflora	Orange triumph	New Fensham	Peace *)	Raspberry	Apple stock	
1. Untreated	1	1	1	1	1	1	1	1	1	1	1	Good foliage, no leaf drop
2. 10% ammonium sulfate	5	1	5	2	7	8	8	8	8	9	4	Some leaves at tip of shoot, no damage
3. 20% ammonium sulfate	7	3	7	2	8	8	8	10	10	8	5	Almost defoliated, no damage
4. 2% Endothal	8	1	6	1	8	9	7	9	5	9	10	Almost defoliated, no damage
5. 2% Endothal / 2% copper sulfate	8	3	6	1	7	9	9	9	6	9	10	Some copper damage, some wilted leaves attached
6. 3% copper sulfate	3	2	2	1	4	4	1	2	5	6	5	Copper damage to shoots, blue spots
7. 6% copper sulfate	5	3	4	1	7	5	8	7	5	8	7	Much copper damage - disfigure shoots
8. 3% pentachlor phenol	3	1	7	2	4	6	7	10	4	6	2	Wilted leaves attached - severe damage to shoots

*) sprayed twice at 2 days interval.

Table 2.

Defoliation of Woody Plants 1962

Defoliation 1-10, 1 = full foliage, 10 = all leaves dropped
Damage to shoots 1-10, 1 = no visible damage, 10 = shoots dead
Regrowth 1-10, 1 = no new growth, 10 = strong shoots

Roses. Variety: Hanne

	Sprayed 11/9 1962				Sprayed 20/9 1962				Sprayed 19/10 1962				Sprayed 11/9 1962	Sprayed 20/9 1962	Sprayed 19/10 1962
	leaf drop		damage to shoots		leaf drop		damage to shoots		leaf drop		damage to shoots		Regrowth 1963		
	8/10	18/10	8/10	18/10	8/10	18/10	8/10	18/10	2/11	8/11	2/11	8/11	15/8	15/8	15/8
1. untreated	1	1	1	1	1	1	1	1	1	1	1	1	10	10	10
2. 10% amm. sulfate	8	10	1	1	6.5	9	1	1	7	10	1	1	10	10	10
3. 20% amm. sulfate	10	10	1	1	9	10	1	1	6	10	1	1	10	10	10
4. 2% Endothal	4.5	5	1	1	4.5	7.5	1	1	5	9	2	2	10	10	10
5. 3% Endothal	7	8.5	1	1	6.5	10	1	1	6	10	1	2	9	9	10

Table 3.

Defoliation of Woody Plants 1962

Defoliation 1-10, 1 = full foliage, 10 = all leaves dropped
Damage to shoots 1-10, 1 = no visible damage, 10 = shoots dead
Regrowth 1-10, 1 = no new growth, 10 = strong shoots

Roses. Variety: Peace

	Sprayed 11/9 20/9 1962				Sprayed 20/9 4/10 1962				Sprayed 11/9 20/9 1962	Sprayed 20/9 4/10 1962
	leaf drop		damage to shoots		leaf drop		damage to shoots		Regrowth 1963	
	8/10	18/10	8/10	18/10	8/10	18/10	8/10	18/10	15/8	15/8
1. untreated	1	1	1	1	1	1	1	1	10	10
2. 20% amm. sulfate	8	10	1	1	2.5	9.5	1	1	10	10
3. 30% amm. sulfate	9.5	10	1	1	4	10	1	1	10	10
4. 3% Endothal	7.5	7.5	1	1	2	7	1	1	9	9
5. 4% Endothal	8.5	8.5	1	2.5	3.5	8.5	1	3	8	8

Fig. 1. New Frensham defoliated with 20% ammonium sulfate.

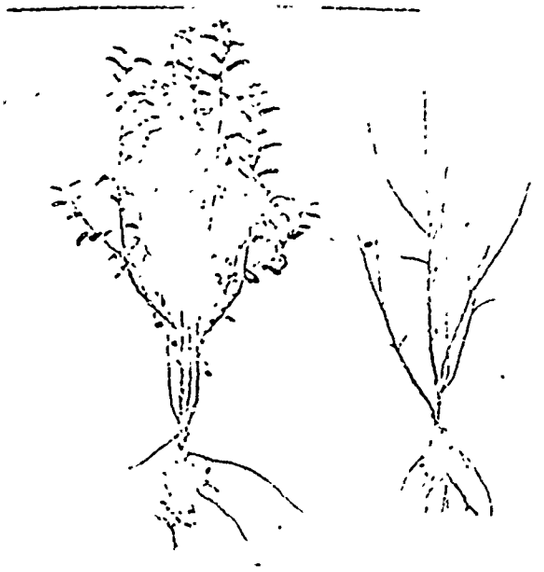


Fig. 2. Apple stock M IV defoliated with 2% Endothal.